16

LAWS OF MECHANICAL NOTATION.

(FOR CONSIDERATION.)

CHAP. I.

ON LETTERING DRAWINGS.

ALL machinery consists of—

Framing. — Fixed. Moveable.

Parts, or Pieces. — Moveable as axes, springs, &c.

Every *Piece* possesses one or more *Working Points.* These are divided into two classes, those by which the Piece acts on others, and those by which it receives action from them: these are called *Driving* and *Driven Points.* A *Working Point* may fulfil both these offices, as, for example, the same teeth which are driven by one wheel, may in another part of their course drive other wheels.

The following alphabets of large letters are used in Drawings:—

Etruscan.	Roman.	Writing.
A *A*	A *A*	𝔄 𝒜
B *B*	B *B*	𝔅 ℬ
C *C*	C *C*	ℭ 𝒞
. . .	. . .	. . .

The following alphabets of small letters are used:—

a b c d . . . .

a b c d . . . .

It is most convenient, and generally sufficient, to use only the letters *a, c, e, i, m, n, o, r, s, u, v, w, x, z,* of both these latter alphabets.

Rule 1.—Every separate portion of *Frame-work* must be indicated by a large *upright* letter.

Rule 2.—Every *Working Point* of Frame-work must be indicated by a *small* printed letter.

Rule 3.—*Frame-work* which is itself moveable, must be represented by a *large upright* letter, with the sign of motion in its proper place below it (*see Signs of Motion*), as

$$\underline{\mathrm{G}} \qquad \underset{\smile}{\mathrm{H}}$$

Rule 4.—In lettering Drawings, commence with the axes. These must be lettered with *large inclined* letters, of either of the three alphabets. Whenever the wheels or arms of any two or more adjacent axes cross each other on the plan, avoid denoting those axes by letters of the *same* alphabet.

Rule 5.—In lettering *Pieces* as wheels, arms, &c. belonging to any axis, whether they are fixed to it or moveable upon it, always use *inclined capitals* of the *same* alphabet as that of the letter representing the Axis.

Rule 6.—Beginning with the lowest *Piece* upon an Axis, assign to it any *capital* letter of the *same* alphabet. To the Piece next above, assign any other *capital* letter which occurs *later* in the *same* alphabet. Continue this process for each *Piece.*

Thus, although the succession of the letters of the *same* alphabet need not be continuous, yet their occurrence in *alphabetic* order will never be violated.

Rule 7.—In lettering *Pieces* upon axes perpendicular to the elevation, or to the end views, looking from the left side, the earliest letters of the alphabet must be placed on the pieces most remote from the eye.

Rule 8.—No axis, which has a *Piece* crossing any other *Piece* belonging to an adjacent axis, must have the same identity as that axis.

If there are many *Pieces* on the same axis, it may be necessary to commence with one of the earlier letters of the alphabet.

Rule 9.—In placing letters representing any *Piece* on which portions of other *Pieces* are projected, it is always desirable to select such a situation that no doubt can be entertained as to which of those *Pieces* the letter is intended to indicate. This can often be accomplished by placing the letter upon some portion of its own *Piece* which extends beyond the projected parts of the other *Piece.*

Rule 10.—When *Pieces* are very small, or when they are crossed by many other lines, it is convenient to place the letter representing them outside the *Piece* itself, and to connect it with the *Piece* it indicates by an arrow. This arrow should be a short fine line terminated by a head, abutting on, or perhaps projecting into, the piece represented by the letter.

Rule 11.—When upon any drawing, a letter having a dot beneath it occurs, it marks the existence of a *Piece* below.

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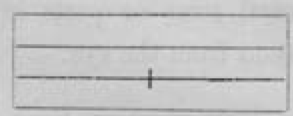
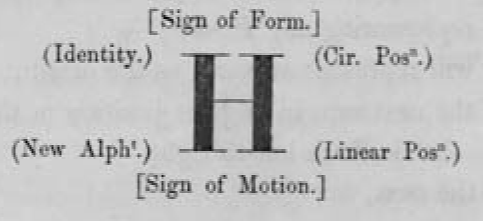
Rule 12.—In case another *Piece*, exactly similar to one already represented and lettered, exists below it, it cannot be expressed by any visible line. It may, however, be indicated by placing its proper letter outside, and connecting that letter with a *dotted* arrow abutting on the upper *Piece*.

Rule 13.—The permanent connexion of two pieces of matter, or the permanent gearing of two wheels, is indicated by a short line, crossing, at right angles, the point of contact. The sign | indicates, in a certain sense, fixed connexion. This sign will be found very useful for indicating the boundaries of various pieces of framing.



OF THE INDICES OF LETTERS.

Rule 14.—Various indices and signs may be affixed to letters. Their position and use are indicated in the subjoined letter:—



Rule 15.—The index on the left hand upper corner is used to mark the identity of two or more parts of a *Piece* which are permanently united; each being denoted by a letter with the *same* index.

Rule 16.—It is used also to connect any *Piece* itself with its various working points. Thus all the small letters which indicate the working points, must have the *same* index of identity as the letter expressing the *Piece* itself.

Rule 17.—Every *Working Point* must be marked by the *same small letter* as the *Working Point* of the *Piece* upon which it acts.

Rule 18.—The bearings in which axes work, as well as the working surface of the axes themselves, and also the working surfaces of slides, are *Working Points*, and must be lettered as such.

OF THE INDEX OF LINEAR POSITION.

The successive order in which the various *Pieces* upon one axis succeed each other is indicated by the alphabetic succession.

It may, however, in some cases be convenient to distinguish between the relative heights of the various arms or wheels which constitute one *Piece.*

This may be easily accomplished by means of the index of *linear position.*

Every Piece may be represented as a whole, by one letter, with its proper index of identity. If, however, it is necessary to distinguish the different arms or parts of which it is composed, so as to indicate their relative position above the plane of projection, this may be accomplished by means of the indices of linear position.

Rule 19.—If ${}^3P$ represent the whole of any *Piece,* ${}^3P_1$, ${}^3P_2$, ${}^3P_3$, ${}^3P_4$, &c. will represent in succession the several arms or parts of which ${}^3P$ is composed: ${}^3P_1$ indicating that which is most distant from the eye.

OF THE INDEX OF CIRCULAR POSITION.

It may occasionally be desirable to indicate the order of succession in angular position of the various arms belonging to the same *Piece,* when projected on a plane. The index on the right hand upper corner is applied to this purpose.

Rule 20. ${}^6R$ representing any *Piece,*
${}^6R^1$ will represent any arm as the origin,
${}^6R^2$ the next arm in angular position in the direction "*screw,*"
that is, from left to right.
${}^6R^3$ the next, &c.

Thus,

$$ {}^6R^1_1,\ {}^6R^2_2,\ {}^6R^3_3 \ldots\ {}^6R^n_n $$

would represent n arms placed spirally round an axis at various heights above it.

OF THE INDEX OF NEW ALPHABET.

In case the three alphabets given above are found insufficient, the index on the left lower side is reserved to mark new alphabets. In the most complicated drawing I have scarcely ever had occasion to use it. It might in some cases be desirable to have a fourth alphabet, differing in form from those already given.

Mr. Babbage *will feel obliged by any criticisms, or additions to these Rules of Drawing, and to the Mechanical Alphabet, and requests they may be addressed to him by post, at No.* 1, *Dorset Street, Manchester Square.*

July 1851.

Signs proposed for consideration June 1851.

ALPHABET OF FORM 7TH EDN

1	Centres Solid. Hollow.	•	○		
2	Boss	◎			
3	Arms Driving or Driver	○–	–○		
4	Arms Driving or Driver	–○			
5	Points Do. Do.	→	←		
6	Pins. Solid. Hollow	╿	╿		
7	Arms Driving with solid pin Driven	○–ı	ı–○		
8	Do. with hollow pin	○–◦	◦–○		
9	Stops. Stopping. Stopped	⊣	⊢		
9	Stopping Arms	○⊣	⊢○		
10	Gearing Single Tooth	∩	∪	∩	⊃
11	Arm	⊓	⊔		
12	Wheel Teeth	⌂	⊔		
13	Pinion	⊡	⌂	◬	⊃
14	Sector	⌒		◝	)
15	Wanting Tooth Wheel	◠		◝	)
16	Rack	Ш			∃
17	Cam. Single Tooth	⟋	∨		⟍
18	Arms	⌟	∇		
19	Wheel Teeth	⊿			⌞
20	Rachet Single Tooth Right	V	Λ		
21	Wheel Teeth	Λ	V		
22	Arm	◹	▽		
23	Single Tooth Left	V	Λ		⟍
24	Wheel	△	⊻		◺
25	Arm	◹	▽		
26	Retaining & Correcting Tooth	▿	∨	⊻	
27	Arm	▿	∠		
28	Wheel Teeth	△			
29	Locking Single Tooth	˥	⊔		
30	Arm	¬	╨		

31	Wheel Teeth	⫫			⊢
32	Levers Straight. Cranked	–+–	–˩–		
33	Bar or Link	⊢–⊣			
34	Links fixed centre in left	•–•	•–○	⦶–•	⦶–○
35	No fixed centre	•–•	•–○	○–•	○–○
36	Fixed centre in right	•–•	•–⦶	○–•	○–⦶
37	Both centres fixed	•–•	•–⦶	⦶–•	⦶–⦶
38	Three centres in line	○○○			
39	Three centres not in line	∘ₒ∘			
40					
41					
42	Slide	—			
43	Slides. V.s.	V	Λ		
44	Slot	▯			
45	Slot with Arms	–▯	▯–		
46					
47	Crank	⌄			
48	Eccentric Hooks Joint	◉	⊕		
49	Bolt	†			
50	Key & Counter Key	⊓	⊔		
51	Clutch & Counter Clutch	┌┐	└┘		
52	Fork & Fork Collar	Y	I		
53	Fork & Fork Pin	–⊂	╿		
54	Inclined Planes Driving & Driven	◁	◀		
55	Escapement	◇			
56	Screws Right handed. Left	Z	Σ		
57	Drums Conical	○	▭		
58	Pulley	⊙			
59	Arms Driving with Pulley Driven	○–•	•–○		
60	Barrels Cam. Jacquard Stud	○̇	▤	○̇	
61	Piston	⊥			

62	Cylinder	⊓			
63	Valve	⍀			
64	Hammer	⊣			
65	Bell	⋒			
66	Knife	⟋			
67	Grind Stone	⊟			
68	Handle	⅃			
69		○̍			
70	Weight	□̍			
71	As Counterpoise	–□			
72	Pendulum				
73	Fly Wheel. Fly Vane	⊙	⁄		
74	Spring	◎			
75	Frame. Fixed	□			
76		┌	┬		
77	Plummer Blocks Lower Upper Solid Double	⌣	⊓	⊡	⊟
78	Punch Matrix	▽	⎍		
79	Chain	∞			
80	Strap	=			
81					
82					
83					
84					
85					
86					
87	Handle with Ratchet	⅃			
88	Handle with locking Teeth	⊏			
89	Handle with both	⊐			
90					
91					
92					

ALPHABET OF MOTION

1	Circular in Plan	○			
2	Reciprocating in Plan	◡			
3	Linear in Plan	—			
4	Linear in plat at right angles	–•			
5.	Circular in Elevation right side left side	◶		◴	
6	Reciprocating in elevation	◡		◠	
7	Linear in Elevation	|			
8	Curvilinear	∼			
9	Reciprocating in End View	ↄ		◡	
10	Circular in End View	⊖		⊖	
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